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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/089,985	04/03/2002	Sakari Laitinen-Vellonen	11001.094	3221
7590	12/30/2004		EXAMINER	
Christopher J Fildes Fildes & Outland Suite 2 20916 Mack Avenue Grosse Pointe Woods, MI 48236			OLSEN, KAJ K	
			ART UNIT	PAPER NUMBER
			1753	
DATE MAILED: 12/30/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/089,985	LAITINEN-VELLONEN, SAKARI	
	Examiner	Art Unit	
	Kaj K Olsen	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 September 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-26 is/are pending in the application.
- 4a) Of the above claim(s) 14-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7/21/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election of group II, claims 18-26 in the reply filed on 9-23-2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement; the election has been treated as an election without traverse (MPEP § 818.03(a)).

Specification

2. The disclosure is objected to because of the following informalities: In the beginning of the specification, applicant should specify that this application is a U.S. national stage entry of the international application.
3. On page 3, line 34, applicant refers to "point IV - IV of figure 3". The examiner cannot find any "IV -IV" in figure 3.
4. On page 5, line 13, the "12" should be --13--.
5. On page 8, line 29, the examiner is entirely unclear what "Fe₃" and "Fe₂" are referring to (the +3 and +2 oxidation states for iron?). Applicant should amend this to just be --iron--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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7. Claims 18-26 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. These claims are drawn to an electrochemical sensor comprising a plurality of electrode series with each series comprising a working, counter, and reference electrodes and further including a common bias electrode for all of the series. The examiner is confused about how this common bias electrode is being utilized. In particular, the applicant does not appear to ever explain how this electrode is utilized in conjunction with the various electrode series. The term "common bias" would appear to suggest that it is being utilized like a reference electrode, namely providing a stable reference voltage that the counter and working electrodes operate about. However, applicant has already provided a reference electrode in each of the electrode series. Hence if the examiner is interpreting the purpose of the common-bias electrode correctly, it would appear that either the common-bias electrode or the various reference electrodes are redundant because they are merely duplicating function already provided. What is the purpose of a common bias electrode when all the individual electrode series already possess a reference electrode providing the same common bias? Alternatively, why does the applicant need the various reference electrodes when applicant already provides a common bias electrode? Clarification as to the purpose of the common bias electrode and whether its function is redundant with the reference electrodes is requested.

8. In claim 24, applicant has claimed that the pipes should be arranged in manner that liquid remains around the sensors during a shutdown. Applicant has never explained what arrangement of pipes would make this possible. The only reference to this arrangement is at p. 9, lines 11-13,

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but no specific explanation of how this could be accomplished is ever set forth. One possessing ordinary skill in the art would not have been enabled to provide the claimed arrangement of claim 24.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 18-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

11. In claim 18, it is unclear if the text following "i.e." is part of the claimed invention or not.

12. Claim 18 is confusing because it appears to have numerous redundancies. In particular, early in the claim, applicant references the presence of "several" working electrodes, plural reference electrodes and a singular counter electrode. Later on in the claim, applicant then states they are 4-15 electrode series where each series comprises a working, reference and counter electrodes. Assuming that the previous "several" is the same thing as the later "4-15" and the various working, reference and counter electrodes are referring to the same thing in each part of the claim, it is unclear why the features of invention are being claimed twice (albeit in a different manner each time). Similarly applicant earlier refers to a singular pre-amplifier and then later refers to each of the series as having its own pre-amplifier. Presumably the applicant is referring back to the earlier defined pre-amplifier(s), but it is unclear why the same feature is being claimed in a different manner twice. Is the earlier portion of the claim just part of the preamble and merely intended use? Even so, applicant needs to be consistent in how features earlier discussed in the preamble are referred back to in the body of the claim. In addition, the various

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elements of the invention being mentioned again must be prefaced with a --the-- or --said-- to be clear that the applicant is referring back to the originally defined element.

13. In claim 18, it is unclear what the scope of a “minimized connection” would be. How would one possessing ordinary skill in the art know if they have established a minimized connection? Clarification is requested.

14. In claim 19, the “a common bias electrode” should be --the-- or --said-- common bias electrode.

15. The use of “Fe₃” and “Fe₂” in claim 20 is confusing for the same reasons highlighted above for the specification.

16. Claim 20 does not utilize appropriate Markush type language to refer to the various alternative materials.

17. In claim 22, there is no antecedent basis for “the radial channels”. It would appear that claim 22 should either depend from claim 19 or that claim 21 should depend from claim 19. The latter “said channels” should be --said *radial* channels--.

18. In claim 24, “the sensor pipes” lacks antecedent basis. Moreover, even if there were antecedent basis for the pipes, it is unclear how these specified pipes cooperate with any of the specified structure.

19. In claim 24, the use of “the sensors” is confusing for two reasons. First, it should be singular because applicant has only claimed a singular sensor. Second, the examiner believes this should be “the electrodes” instead.

20. In claim 25, the “the channel” should either be --the channels-- or --each channel--.

21. In claim 26, the “the electrode” should be --the *common bias* electrode--.

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22. Claim 26 specifies that the electrode “is a high-speed temperature sensor” (emphasis added). The “is” should be --contains--. See p. 8, lines 7 and 8.

Claim Rejections - 35 USC § 103

23. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

24. Claims 18, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glass et al (USP 5,120,421) in view of Liu (USP 4,655,880).

25. With respect to the claims as best understood, Glass discloses an electrochemical sensor for analyzing a liquid that comprises at least five series of working electrodes 200 and counter electrodes 206. See fig. 12 and col. 9, lines 40-65. With respect to each series comprising a reference electrode as well, Glass discloses earlier that the counter electrode can be utilized alone or in conjunction with a reference electrode. See col. 8, line 38-41. Hence Glass recognized that both two and three electrode configurations are known in the art. Although Glass never explicitly stated that discussion at col. 8 could be utilized for the embodiment described in col. 9, one possessing ordinary skill in the art would have recognized based on Glass's discussion that a three electrode configuration of the fig. 12 embodiment would have required only routine skill in the art. With respect to the claimed common bias electrode, any of the additional reference or counter electrodes 206 not counted as part of the various series would have read on this additional electrode because this claimed electrode would appear to be a redundant electrode (see

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the 112 first paragraph rejection above). With respect to the electrode being for the establishment of a common-bias, there is no claimed structure explicitly drawn to the use of this electrode as being for establishing a common bias. Hence the use of the electrode as a common bias electrode constitutes the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability. Glass discloses the use of a potentiostat for analyzing the electrode response, but does not explicitly identify the use of a pre amplifier to amplify these various electrode signals. Liu teaches in an alternate sensor that potentiostat circuits comprise the amplification of the working electrode signals. See fig. 1 and col. 6, lines 24-37. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to amplify the electrode signals such that their current responses can be more readily monitored. With respect to the amplifier being a “pre-amplifier”, the examiner is not aware of any fundamental distinction between an amplifier and a pre-amplifier and the amplifier of Liu would read on the claimed pre-amplifier of the instant invention. With respect to the “minimized connection”, absent an explicit recitation of what the applicant construes as being a minimized connection”, the spacing between the amplifiers and electrodes of Glass in view of Liu would read on this connection. With respect to the measuring cell, any environment the sensor of Glass is placed in would constitute a measuring cell giving the claim language its broadest reasonable interpretation.

26. With respect to the electrode materials, see Glass, col. 8, lines 54-63.

27. With respect to the immediate vicinity, again absent an explicit definition of what constitutes an immediate vicinity, the vicinity shown by Liu would meet this limitation.

Alternatively, it is well known that the longer one delays amplifying a small measurement signal,

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the more corrupted the measurement signal can get. Hence one possessing ordinary skill in the art would have been motivated to move the amplifier of Liu to the immediate vicinity of the electrodes to prevent undesirable signal degradation. In addition, see the alternative rejection below.

28. Claims 18, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winqvist et al (Meas. Sci. Technol., 9, pp. 1937-1946, 1998) in view of Liu.

29. With respect to the claims as best understood, Winqvist discloses an electrochemical sensor comprising at least six working electrodes as well as a counter and reference electrode. See fig. 1 and section 3.2. Claim 18 differs from the teaching of Winqvist by setting forth that each cell comprises a counter and reference electrode. However, it is well known in the art that a plurality of working electrodes can be provided with a single reference and counter electrode for all the working electrodes or each be provided with its own reference and counter electrode. This is demonstrated by the teaching of Liu where there are embodiments that utilize only a single reference and counter electrode for all the working electrodes (fig. 6) like Winqvist, or utilize a counter and reference electrode for each working electrode (fig. 1 and 5). See col. 2, lines 41-51. The use of a plurality of reference and counter electrodes (albeit more complex) would give an operator the flexibility to operate the various working electrodes in a more independent manner providing an operator with greater flexibility. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Liu and provide separate reference and counter electrodes for each working electrode for the sensor of Winqvist in order to provide the operator with greater flexibility in operating the working electrodes. With respect to the presence of a common-bias electrode, any of the

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additional reference or counter electrodes not counted as part of the various series would have read on this additional electrode because this claimed electrode would appear to be a redundant electrode (see the 112 first paragraph rejection above). With respect to the electrode being for the establishment of a common-bias, there is no claimed structure explicitly drawn to the use of this electrode as being for establishing a common bias. Hence the use of the electrode as a common bias electrode constitutes the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability. With respect to the measurement cell, the beaker of fig. 1 of Winqvist would read on the defined measurement cell. With respect to the presence of a pre-amplifier, Winqvist (like Glass previously) did not explicitly recite the use of an amplifier as part of the potentiostat. However, Liu also discloses the presence of such an amplifier as part of the conventional potentiostat. See fig. 1 and col. 6, lines 24-37. With respect to the “minimized connection”, absent an explicit recitation of what the applicant construes as being a minimized connection”, the spacing between the amplifiers and electrodes of Winqvist in view of Liu would read on this connection.

30. With respect to the electrode materials, see section 3.2 of Winqvist.

31. With respect to the pre amplifier being in the immediate vicinity, again absent an explicit definition of what constitutes an immediate vicinity, the vicinity shown by Liu would meet this limitation. Alternatively, it is well known that the longer one delays amplifying a small measurement signal, the more corrupted the measurement signal can get. Hence one possessing ordinary skill in the art would have been motivated to move the amplifier of Liu to the immediate vicinity of the electrodes to prevent undesirable signal degradation. In addition, see the alternative rejection below.

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32. Claim 21 is rejected in the alternative under 35 U.S.C. 103(a) as being unpatentable over either Glass or Winqvist in view of Liu as applied to claim 18 above, and further in view of Toxic Gas CiTiceLs (hereafter "Citicels"). Citicels is a manual for the products of City Technology Ltd that was provided to the examiner on a communication dated 7-30-1999. Hence the reference was published on or before 7-30-1999.

33. If the conventional spacing in the art (and as shown by either Glass or Winqvist in view of Liu) is not construed as reading on the claimed "immediate vicinity", Citicels teaches an embodiment that amplifiers can be placed on a circuit board mounted right below a sensor in order to amplify the signal. See fig. 17 (the second of two figures labeled "17") and 18 and p.

29. This configuration would prevent a microamp level signal from being corrupted by long transmittal lengths. In addition, said configuration allows the sensor to have its calibration being programmed in at the source of the sensor. See p. 29. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Citicels for the sensor of either Glass or Winqvist in view of Liu in order to prevent the signal from being corrupted and to provide the calibration at the source of the sensor.

34. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over either Glass or Winqvist in view of Liu as applied to claim 18 above, and further in view of Goerg et al (USP 3,616,272).

35. The references set forth all the limitations of the claim, but did not specify the presence of any sensor pipes. However, the use of pipes to deliver fluid to an electrochemical sensor is well known in the art. In particular, ^{oe}Goerg shows such a configuration that utilizes pipes to provide sample to a sensor and discharges said fluid allowing continuous measurements. See fig.

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1 and col. 1, lines 3-21. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Geörg^{oe} for the sensor of either Glass or Winqvist in view of Liu in order to allow for continuous measurements. With respect to the claimed arrangement for the pipes (see 112 first paragraph rejection above), the structure of Geörg^{oe} would be capable allowing fluid to remain around the sensor at all times (for example, by closing valves 4 and 8). Whether or not the references disclosed doing so only constitutes the intended use of the sensor pipes and the intended use need not be given further due consideration in determining patentability.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (571) 272-1344. The examiner can normally be reached on Monday through Thursday from 5:30 A.M. to 3:00 P.M. and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

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system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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December 15, 2004

A handwritten signature in black ink, appearing to read 'Kaj K. Olsen', with a long horizontal flourish extending to the right.

KAJ K. OLSEN
PRIMARY EXAMINER